

### CLAIMS

1. A chimeric DNA construct comprising at least one  
5 repressor sequence in transcriptional fusion with at least one plant-specific  
sequence that codes for a protein or fragment thereof that binds to DNA or that  
activates transcription either by binding to DNA itself or by interacting with a  
DNA-binding protein ;  
said repressor sequence being operably linked to elements allowing the  
10 transcription of said fused sequences.

2. A chimeric DNA construct according to claim 1, wherein  
said repressor sequence is at least the repressor domain of the *Drosophila*  
*engrailed* gene (*eng*).  
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3. A chimeric DNA construct according to claim 1, wherein  
said repressor sequence encodes for at least the Kruppel-associated box-A  
(KRAB-A) domain of zinc finger proteins, or for at least the RE-1-silencing  
transcription factor (REST), or for at least the BTB (for Broad-complex Tramtrac  
20 and Bric) domain, also known as POZ-domain.

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4. A chimeric DNA construct according to any of claims 1 to 3,  
wherein said plant-specific sequence codes for at least a DNA-binding domain  
of a plant transcription factor.

5. A chimeric DNA construct according to claim 4, wherein  
said transcription factor is selected from the group consisting of STM, AP3,  
ZmHox, Ms-41-A and Zm41-A.

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6. A chimeric DNA construct according to any of claims 1 to 3,  
wherein said plant-specific sequence activates transcription by interacting with  
a DNA-binding protein.

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5 7. A chimeric DNA construct according to any of claims 1 to 6, further comprising a sequence that encodes at least the hormone-binding domain of a steroid hormone receptor, said sequence being in frame with the fusion construct consisting of at least one repressor sequence in transcriptional fusion with at least one plant-specific sequence that codes for a protein or fragment thereof that activates transcription either by binding to DNA itself or by interacting with a DNA-binding protein ;

10 whereby the nuclear localization of the chimeric protein, that is the product of the translation of said fusion construct is dependent on the application of said steroid hormone or analogues thereof.

15 8. A chimeric DNA construct according to claim 7, wherein said hormone-binding domain of steroid hormone receptor is the hormone-binding domain of a glucocorticoid receptor.

9. A chimeric DNA construct according to any of claims 1 to 8, wherein the elements allowing the transcription of said repressor sequence comprise a constitutive promoter.

20 10. A host cell transformed with a DNA construct according to any of claim 1 to 9.

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25 11. A transgenic plant or parts thereof, said plant being transformed with a DNA construct according to any of claims 1 to 9, or deriving from a plant initially transformed with a DNA construct according to any of claims 1 to 9.

30 12. A method for obtaining a transgenic plant according to any of claims 10 or 11, wherein a DNA construct according to any of claims 1 to 9 is transferred and expressed in a plant cell and said cell is cultured under conditions for regenerating a whole transgenic plant.

13. Use of a chimeric DNA construct according to any of claims 1 to 9 for inhibiting the expression of a target gene in the genome of a plant, the transcription of which is activated by a protein encoded by a plant-specific sequence as defined in any of claims 1 to 9.

14. A method for determining the function of a transcription factor in plants, comprising the steps of:

- i) fusing a sequence encoding said transcription factor to a repressor sequence to form a DNA construct as defined in any of claims 4 to 9 ;
- ii) transforming plant cells with said DNA construct;
- iii) culturing the plants obtained from the transformed cells and observing a phenocopy of a mutation correlated with the loss of expression of genes controlled by said transcription factor.

15. A method for identifying new genes in plants, comprising the steps of :

- i) obtaining transgenic plants transformed with a chimeric DNA construct according to any of claims 1 to 6 ;
- ii) comparing the RNA population from said transgenic plants with the RNA population of a plant that has not been transformed with a chimeric DNA construct according to any of claims 1 to 6, by amplifying the RNAs repressed by expression of the chimeric DNA construct, identified as genes inactive in said transgenic plants obtained in step i) but active in the plant that has not been transformed with a chimeric DNA construct.

16. A method for identifying new genes in plants, comprising the steps of :

- i) obtaining transgenic plants transformed with a chimeric DNA construct according to claims 7 or 8, comprising a sequence that encodes at least the hormone-binding domain of a steroid hormone receptor, and/or according to claim 9, comprising an inducible promoter ;

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ii) submitting said transgenic plants to an induction by means of a steroid hormone or analogues thereof and/or promoter inducer, whereby a phenocopy is created due the loss of expression of target genes ;

5      iii) comparing the RNA populations from said transgenic plants before and shortly after induction, by amplifying the RNAs repressed by expression of the chimeric DNA construct, identified as genes active before but inactive after induction.